(54) Title: COUPON/VOUCHER DISPENSING MACHINE AND METHOD

(57) Abstract

A coin sorting and counting machine (100) and a method for operating it to automatically dispense cash vouchers based on the value of the counted coins, manufacturers' coupons and store coupons. Coins are placed in a hopper tray (120). When the hinged tray is lifted, the coin travel through a waste management system and into the coin sorting and counting apparatus. The value of the coins and the number of coins within each denomination are displayed as the coins are counted. After sorting, the coins fall into a temporaty holding area (105). At this point the transaction can either be canceled or accepted. If the transaction is canceled, the coins are returned. If the transaction is accepted, the coins fall into a storage area (210) and the user is issued a cash voucher and a series of store coupons. Manufacturers' coupons are dispensed regardless of whether or not the transaction is accepted.

Coupon/voucher dispensing machine and method

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BACKGROUND OF THE INVENTION
          The present invention relates to coupon dispensing
machines and coin sorting machines.
10   There are a variety of machines which dispense
stamps, tickets, coupons, money orders, bank transactions or
the like. One type of machine, shown in U.S. Pat. No.
5,039,848 to Raymond Stoken, dispenses coupons in exchange for
money. A display area indicates the different coupons
15 available as well as the specific amount of money required to
obtain each particular coupon. Money is inserted into the
machine via a coin slot. Control circuitry determines which
coupon has been selected, the amount of money required to
purchase this coupon, and if the correct amount of money has
20 been inserted into the coin slot. The control circuitry then
causes the coupon dispenser to dispense the requested coupon.
          Other machines dispense other types of products. For
instance, U.S. Pat. No. 5,021,967 to Lawrence Smith is a money
order dispensing machine. This machine is meant to be operated
25 by a system operator, not a customer, and therefore does not
require the capability to receive money. The machine prints
money orders on a dot matrix printer after receiving the
necessary data inputs from the operator.
          A different variety of machines has been patented
30 which sort coins. One such machine, shown in U.S. Pat. No.
4,995,848 to David Goh uses two methods to sort coins, both
methods based on the diameter of the coins. In this machine
the coins are loaded into a hopper. A rotating wheel feeds the
coins individually onto an inclined ramp. The coins roll down
35 the ramp with their rear surfaces resting against a support
surface. Specific denominations are selected when they fall
through slots of varying size located in the support surface.
Specific denominations are also selected using peeler knives
which are arranged at different distances from the ramp
40 surface. These knives topple the coins from the ramp into

bins. Using both techniques allows a short ramp to be employed. Another type of machine shown in U.S. Pat. No. 4,059,122 to Yoshio Kinoshita counts the number of coins according to denomination after sorting the coins.

SUMMARY OF THE INVENTION

The present invention provides an apparatus which can receive a number of unsorted coins. The coins are sorted and counted to determine a total value. The user is issued a voucher for an amount related to the total value.

The present invention offers a valuable service to the retailer in whose store this machine is placed as well as to the actual user. People tend to collect coins at home, finding that carrying large quantities of coins is unwieldy and impractical. Furthermore, spending coins normally requires either placing the coins singularly into product dispensing machines or counting the coins out by hand. This invention allows the user to periodically exchange excess coins for cash vouchers. The user need not first count the coins since the present invention automatically counts the coins. The advantages to the retailer are numerous. First, although the voucher is exchangeable for cash or merchandise, most customers are likely to purchase goods at the store where they exchange their coins. Second, by offering a convenience to their customers, retailers gain the goodwill of these customers. Thus, the present invention provides a voucher issuing machine in which the amount of the voucher is not preset, and also allows coin sorting by a typical consumer.

In the preferred embodiment coins are placed in a hinged hopper tray built into one of the machine's surfaces. To activate the process the user presses a "go" button and then lifts one edge of the tray, causing the coins to fall down a chute to the high speed coin sorting and counting mechanism. Coins are counted and sorted by denomination and then dropped into a temporary holding area called an escrow tray. As the coins are counted, the total monetary value is displayed on a video screen as well as the number of coins counted within each denomination. After all of the coins have been counted, the

user is asked to make a decision, either rejecting the transaction or allowing the transaction to proceed. If the transaction is rejected, the coins are returned to the user via a return chute. If the transaction is accepted, the coins are

5   dropped into separate bins or trays based upon their denomination. This triggers the controller to print and dispense a cash voucher to the user via a slot in the machine's surface.

Besides exchanging cash vouchers for coins, in the

10   preferred embodiment the invention dispenses manufacturers' coupons from a separate slot redeemable for various bargains. These coupons are dispensed at no cost to the user. A second type of coupon to be dispensed in the preferred embodiment are store coupons. These coupons are printed by the cash voucher

15   printer and dispensed through the same slot as the cash vouchers and are good only for specific bargains unique to that store. For example, the store owner may have a surplus of a particular item and therefore wish to offer a "two-for-one" bargain for a limited time. Selected products and bargains may

20   also be promoted on the video display. These promotional techniques have the advantage of being easily alterable; thus an individual store owner can tailor the store coupons/ads depending upon factors such as the time of day (e.g., midday grocery store shoppers versus after work shoppers versus late

25   night shoppers) while the chain store owner can vary the store coupons/ads depending upon a particular store's location and needs (e.g., deli shop versus bakery shop versus floral shop).

Generally, in the prior art, coins are either inserted into a machine singularly, or in the case of large

30   commercial sorting machines, by trained personnel. In the present invention, non-trained personnel will dump large amounts of coins into the hopper tray. These untrained users are likely to empty their personal containers, such as old cans or bottles, directly into the hopper without first inspecting

35   the coins. Thus lint, tokens, and various other objects will probably accompany the coins into the machine. Therefore a method of waste management is necessary to insure that the machine is not damaged during use.

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In the preferred embodiment, the user dumps coins
into a hopper tray which doubles as an inspection area. The
bottom of the hopper tray is perforated, thus allowing small
foreign objects to fall through the perforations instead of
5   entering the coin sorting mechanism. While the coins are in
the hopper, the user has an opportunity to remove large foreign
objects. After inspecting the coins, the user first presses a
"go" button indicating they wish to use the machine, and then
lifts one edge of the hinged tray, causing the coins to fall
10 down a waste management chute. This chute leads to the coin
sorting and counting mechanism. In the preferred embodiment,
when the "go" button is pressed, the coin sorter starts, the
coin counter is initialized, and a fan within the waste
management chute is activated. The fan blows light weight
15 debris, such as lint and dust, out of the chute and away from
the coin counter/sorter mechanism. The bottom surface of the
waste management chute is a grooved and porous plate which
allows any fluids dumped into the machine to be removed from
the coins and collected. This helps to avoid possible damage
20 to the machine. Magnetic strips are placed along the entrance
and exit areas of the chute to extract any magnetic tokens
which may have been included with the coins.

Many people have an intrinsic distrust of machines,
especially with regards to machines handling their money, and
25 therefore it is desirable to quickly gain the user's trust.
This invention has several features which accomplish this goal.
First, the front of the machine is clear, encouraging user
trust since the flow of coins can be watched throughout the
process. Second, until the voucher is issued, the user is in
30 control of the process. Prior to issuing the voucher the
display indicates the amount of the coins counted. At this
point the user can either agree with the amount and allow the
transaction to proceed, or can reject the amount and have the
coins returned. Until the user makes this decision, the coins
35 are kept in a temporary holding area called an escrow tray. In
the preferred embodiment, the basic escrow tray is immobile
although the bottom surface of the tray can be manipulated.
Through the manipulation of this surface, the coins are either

returned to the user or dumped into a storage bin within the
machine.

BRIEF DESCRIPTION OF THE DRAWINGS

5   Fig. 1 is an illustration of an embodiment of the
coin exchange apparatus in a likely environment.
           Fig. 2 is a diagram showing the internal layout of
the principal components in the preferred embodiment.
           Fig. 3 is a block diagram of the system level
10 electronic functions.
           Fig. 4 is a flow chart of the operation of the
system.
           Fig. 5 is a flow chart of the operation of a second
embodiment of the system.
15   Fig. 6 is a block diagram of the stepping motor
control circuitry.
           Fig. 7 is a side view of the coin tray and the waste
management system.
           Figs. 8A-B is a diagram of the bottom plate of the
20 waste management system.
           Fig. 9 is a three-dimensional view of the waste
management system.
           Fig. 10 is a front view of the escrow tray.
           Fig. 11 is a side view of the escrow tray.
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DESCRIPTION OF THE SPECIFIC EMBODIMENT(S)
           Fig. 1 is an illustration of the coin exchange kiosk
100 in a possible environment; a supermarket. Kiosk 100 is
free-standing, and has been designed with a small footprint to
30 minimize the required floor space. The lower front surface 110
is clear, allowing the user to watch the coins as they are
separated, counted, and dropped into escrow tray 105. By
making the process visible to the user, trust in the machine is
encouraged. Furthermore, since watching the sorting process is
35 interesting, the user becomes integrated into the machine's
operation and is further encouraged to use the machine.
           Initially the coins are placed in coin tray 120 where
small foreign objects fall through perforations in the bottom

of the tray and the user can remove large foreign materials
prior to coin sorting. When the user is ready to begin the
sorting process, they must push "go" button 115. Button 115
initializes the coin counter, activates the coin sorter, and
5   activates the fan within the waste management chute. If the
system does not detect coins within a predetermined period of
time, both the coin sorter and the fan are deactivated. The
user next raises the edge of tray 120. The tray is hinged on
the right side and acts as a chute to funnel the coins into the
10 kiosk. User directions, transaction information, store
bargains, and advertisements appear on video screen 130.
Screen 130 can also be used to show attention getting displays
in order to attract potential users. Once the coins are
admitted into the kiosk and the go button has been pushed, the
15 waste removal and coin sorting process begins. During the coin
sorting process, coins which do not meet the necessary physical
criteria are rejected and returned to the user via chute 165.
In the preferred embodiment, as the coins are counted the video
screen displays both the total monetary value and the number of
20 coins collected within each denomination.

At the conclusion of the sorting process, the user is
asked to either accept the stated coin value and continue the
transaction, or cancel the transaction. This selection is made
by pushing one of two buttons 150. If the user continues the
25 transaction, then the coins in the escrow tray 105 are dumped
into a depository and the user is issued a voucher through slot
160. In the preferred embodiment, the voucher is worth the
value of the counted coins and is redeemable at the retailer's
cashier for cash or credit towards purchases. Store coupons,
30 printed by the voucher printer and good towards store bargains,
are dispensed with the cash voucher. Manufacturers' coupons
are dispensed through an adjoining slot 165 at no cost to the
user. If the user cancels the transaction the coins are
returned in area 170. The upper back portion 140 of kiosk 100
35 is a display board where advertisements and notices can be
placed. Display board 140 can also be used to indicate what
coupons the machine is currently dispensing.

The internal layout of kiosk 100 is shown in Fig. 2. The coin storage area 210 holds the coins after the transaction has been completed. Area 210 can either be separated into large capacity bins to hold each denomination, or into ready to use coin trays. When the storage area is close to capacity, an indicator 255 on the outside of the kiosk 100 notifies store personnel to empty the storage area 210.

The outside of the waste management system 230 is visible in this diagram. Liquids fall through the porous, grooved bottom plate of system 230 while lint and other fine materials are blown away by a small fan located in the chute. Liquids are collected in a waste receptacle. At the end of system 230, the coins are funneled into the coin counter and sorter 280. This is a commercially available sorter. Several manufacturers make suitable machines, although in the preferred embodiment a Scan Coin Model 109 with a modified hopper is used. The counter accepts mixed coins and is able to detect foreign coins and slugs. Rejected coins are returned to the user through chute 165.

Two different printers are used in the preferred embodiment of the kiosk. Printer 270 is used to print the cash vouchers and the store coupons. The preferred embodiment uses an Epson TM267 printer. Besides containing the amount of the voucher, the voucher will also contain other information such as store name, transaction number, bar codes, etc in order to make counterfeiting difficult. Special papers and inks can also be used to discourage counterfeiting. In the preferred embodiment, a separate printer 295 makes a continuous record of each transaction. This printer is an Epson RP265. In a second embodiment printer 270 serves a double function. Besides printing the vouchers, upon command by store personnel this printer prints out all of the pertinent transactional information. CPU 290 also stores this information.

In the preferred embodiment, VGA screen 250 is a Super VGA monitor; CPU 290 is a Belmont, 386, 40MHz CPU; and high capacity sheet feeder 260 is a modified 1000 sheet feeder manufactured by Gradco, model number HCF-1000. Warning light 255 warns store personnel when either printer is low on paper,

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the sheet feeder is low on paper, or there has been a system malfunction.

Fig. 3 is a block diagram of the system level electronic functions. The entire system is controlled by CPU
5   290. System information is presented on display 130 which is the same monitor used to communicate with the user. System inputs are coupled to CPU 290 via data bus 380. Push button switches 330 and 325 are used by the user to either accept or cancel the transaction. Switch 335 is a maintenance switch
10 which is used by store personnel to command the system to download system information to either the maintenance printer 295 or to a floppy disk. The maintenance switch may also be used to enter a mode to allow clearing of coin jams and an internal store coin counting mode. This internal store coin
15 counting mode will enable the retailer to sort and count coins from vending machines and cash registers, bypassing the voucher and coupon functions. Leading edge sensor 340 tells the system each time a sheet of coupons has been dispensed. Stepping motor 320 dispenses the coupon sheets. Push button switch 115
20 is depressed by the user to initialize the counting system and activate both the coin counter/sorter 280 and the waste management fan. Microswitches 350 and 355 deactivate escrow tray stepping motor 360, thus preventing possible mechanical damage by the stepping motor moving the tray past its
25 designated limits, and indicate to CPU 290 the position of the escrow tray (i.e., at-rest position, returning coins to the user position, or dumping coins into the machine's storage area position). CPU 290 also controls the voucher printer 270.

The flowchart of Fig. 4 illustrates the operation of
30 the coin exchange kiosk in its preferred embodiment. The user places coins of varying denominations into the external tray (step 405). Small foreign matter falls through perforations in the bottom of the hopper tray (step 410) while large foreign matter is removed by the user (step 415). When the user is
35 ready to begin using the machine, they press the "go" button (step 420). Pressing the go button activates the coin sorter, initializes the coin counter, and activates the fan within the waste management chute (step 425). Next the user lifts the

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edge of the hopper tray, dumping the coins down the entrance
chute of the waste management system (step 428). As the coins
go through the waste management system certain waste, such as
liquids, are removed (step 430). The coins are then counted
5   and sorted (step 440). During this step coins which do not
meet the necessary physical criteria are rejected and returned
to the user (step 435). As the coins are counted, the value of
the coins is displayed on the monitor as well as the number of
coins counted within each denomination (step 440).
10 Manufacturers' coupons are dispensed at this time (step 440).
After all of the coins are counted, the user is asked to either
accept the value that has been determined and continue the
transaction or to reject the value and discontinue the
transaction (step 450). If the user decides to reject the
15 stated value then the coins are returned (step 455). If the
user decides to accept the stated value and continue the
transaction then a cash voucher is dispensed for the stated
value (step 460).

        The flowchart of Fig. 5 illustrates the operation of
20 the coin exchange kiosk in a second embodiment. The user
places coins of varying denominations into the external tray
(step 505). Small foreign matter falls through perforations in
the bottom of the hopper tray (step 510) while large foreign
matter is removed by the user (step 515). When the user is
25 ready to begin using the machine, they press the "go" button
(step 520). Pressing the go button activates the coin sorter,
initializes the coin counter, and activates the fan within the
waste management chute (step 525). Next the user lifts the
edge of the hopper tray, dumping the coins down the entrance
30 chute of the waste management system (step 528). As the coins
go through the waste management system certain waste, such as
liquids, are removed (step 530). The coins are then counted
and sorted (step 540). During this step coins which do not
meet the necessary physical criteria are rejected and returned
35 to the user (step 535). As the coins are counted, the value of
the coins is displayed on the monitor as well as the number of
coins counted within each denomination (step 540).
Manufacturers' coupons are dispensed at this time (step 540).

After all of the coins are counted, the user is asked to either
accept the value that has been determined and continue the
transaction or to reject the value and discontinue the
transaction (step 545). If the user decides to reject the
5   stated value then the coins are returned (step 550) and the
transaction ends (step 595).

If the user decides to accept the stated value and
continue the transaction then they are asked whether they would
like to donate, in whole or in part, the value of the coins to
10 a charity (step 553). If the user does not wish to donate to a
charity then a cash voucher is issued (step 577) and the
transaction ends (step 595). If the user wishes to donate to a
charity, then the user is asked to chose to which charity they
wish to donate (steps 557, 560, 565, and 570). If they do not
15 wish to donate to any of the listed charities, then the
transaction ends (step 595) and the coins are returned (step
573).

After choosing to which charity they wish to donate,
the user is asked if they wish to donate the total value of the
20 coins (step 580). If the user wishes to donate the total
amount then a receipt is issued which states the amount and the
charity (step 583). CPU 290 records the amount donated and the
charity (step 583) so that when the coins are removed from
kiosk 100 the proper amounts can be deposited to the
25 appropriate charity organizations. If the user selects to
donate only a portion of the total amount, they then enter the
amount to be donated (step 587). At this point a receipt for
the donated portion is issued, a cash voucher for the remainder
of the total amount is issued, and CPU 290 records the amount
30 donated and the charity for later disbursement of funds (step
590).

Fig. 6 is a block diagram of the stepping motor
control circuitry for the two stepping motors used in kiosk
100. One stepping motor controls the coupon dispenser and the
35 other stepping motor controls the escrow tray. The circuitry
for the two motors are duplicates of one another. The
oscillators in blocks 615 and 620 generate the pulses which set
the stepping motor rates. The dip switches in blocks 615 and

620 allow manual setting of the oscillator rates. Each motor
has a second oscillator, blocks 625 and 630, which set the
chopping rate. The step pattern translators, blocks 635 and
640, use both oscillators to generate the step motor patterns.
5 Two different oscillators are used in order to maximize the
power efficiency.

        In operation, computer 290 determines when power
should be supplied to either the coupon dispenser stepping
motor 645 or the escrow tray stepping motor 650. This input is
10 supplied via interface 610. This signal is received by either
input selector 655 or 660. In the preferred embodiment, this
signal is digital. Depending upon the signal, the selector
determines the length of time the stepping motor will be
operated. For example, one signal from interface 610 will
15 cause the coupon dispenser (motor 645) to dispense only a
single sheet of coupons while a different signal will cause two
sheets of coupons to be dispensed. Similarly, one signal from
interface 610 will cause the escrow tray (motor 650) to rotate
in one direction thereby returning coins to the user, while a
20 different signal will cause the opposite motor rotation thereby
depositing the coins into the coin receptacle. The power drive
units 665 and 670 supply, upon command, sufficient power to
operate stepping motors 645 and 650.

        Fig. 7 is a side view of coin tray 120 and waste
25 management chute 230. Coin tray 120 normally is flush with the
top surface of kiosk 100 (Position 710). The user places their
coins in the tray and at this point removes any obvious foreign
materials. When the user is ready to begin the sorting
process, they lift handle 715 on coin tray 120. The tray is
30 hinged at point 730. When tray 120 is in position 720, the
coins fall through waste management chute 230. The coins leave
chute 230 through opening 740 to enter the coin sorting and
counting mechanism. Liquids accidently dropped into the coin
hopper are funneled through spout 750 to a suitable collection
35 receptacle.

        Fig. 8A is a diagram of the bottom plate of waste
management system 230. Fig. 8B is an enlarged view of a small
section of this plate. The surface of the plate has grooves

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running lengthwise, these grooves forming a series of
alternating peaks 810 and valleys 820. The coins ride along
the surface of the plate while liquids flow down the valleys
820, eventually flowing through perforations 830 drilled in the
5   bottom of the valleys 820. The liquids are then funneled down
spout 750, and collected. The sharp peaks 810, combined with a
teflon coating, help minimize the friction caused by the
liquids which may accompany the coins. This in turn helps
prevent a slow down of the sorting process.
10   Fig. 9 is a three dimensional view of the waste
management chute 230. The coins enter and travel down the
chute in direction 930. As the coins travel down this chute, a
fan (not shown) blows air back up the chute in direction 910.
Light materials, such as small papers and lint, are blown free
15 from the coins and out of the machine. Liquids flow through
the holes in bottom plate 800, flow through spout 750, and are
collected in a separate receptacle. Magnetic strips 950 along
the exit edge of the coin hopper and the entry edge of the
waste management chute collect ferrous objects, such as tokens
20 and slugs, removing them from the coins.
           Fig. 10 is a front view of the escrow tray 105. Tray
105 is divided into four bins. Bin 1010 catches dimes from
sorter 280; bin 1020 catches pennies; bin 1030 catches nickels;
and bin 1040 catches quarters. Stepping motor 360 drives worm
25 gears 1055 and 1060. When activated, stepping motor 360 moves
the bottom surface 1080 of the tray along axis 1070. If the
tray bottom 1080 is rotated outward, toward the user, the coins
are dumped into a coin storage receptacle. If the tray bottom
1080 is rotated inward, away from the user, then the coins are
30 dumped into a return receptacle.
           Fig. 11 is a side view of the escrow tray 105.
Stepping motor 360 drives worm gears 1055 and 1060. When the
stepping motor 360 is activated, worm gear 1060 is rotated
along axis 1070. When gear 1060 is rotated clockwise, the
35 bottom surface 1080 is rotated allowing the coins to be
returned to the user in tray 170. When gear 1060 is rotated
counter-clockwise, the bottom surface 1080 is rotated allowing
the coins to be dumped into a coin depository. Microswitch

1130 prevents the stepping motor from moving the tray bottom
1080 past its pre-determined stops.

    As will be understood by those familiar with the art,
the present invention may be embodied in other specific forms
5 without departing from the spirit or essential characteristics
thereof. For example, the same printer could be used to print
both the vouchers and periodic maintenance reports.
Accordingly, disclosure of the preferred embodiments of the
invention is intended to be illustrative, but not limiting, of
10 the scope of the invention which is set forth in the following
claims.

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WHAT IS CLAIMED IS:

1.   A method comprising the steps of:
receiving a plurality of coins of arbitrary
5   denomination from a user;
sorting said coins into groups, with each group being
one of said denominations;
determining a total amount of said coins; and
dispensing a cash voucher for a value related to said
10 total amount.

2.   The method of claim 1 wherein waste is included
among said coins and further comprising the step of removing
said waste from said coins.
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3.   A method comprising the steps of:
receiving a plurality of coins of arbitrary
denomination from a user;
sorting said coins into groups, with each group being
20 one of said denominations;
dispensing manufacturers' coupons;
determining a total amount of said coins; and
dispensing a cash voucher for a value related to said
total amount.
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4.   The method of claim 3 wherein waste is included
among said coins and further comprising the step of removing
said waste from said coins.

30   5.   A method comprising the steps of:
receiving a plurality of coins of arbitrary
denomination from a user;
removing waste included among said coins;
sorting said coins into groups, with each group being
35 one of said denominations;
determining a total amount of said coins;
displaying the total amount of said coins;
dispensing manufacturers' coupons;

holding the coins in an intermediate holding area;

returning the coins to the user in response to a user input rejecting the total amount;

depositing the coins into a storage area in response
5   to a user input accepting the total amount; and

dispensing a cash voucher for a value related to said total amount in response to a user input accepting the total amount.

10   6.   The method of claim 5 wherein said step of removing said waste further comprising the steps of:

blowing any light materials from the coins;

removing any fluids accompanying the coins;

returning to said user a first type of coins based on
15   electro-magnetic properties; and

returning to said user a second type of coins based on physical dimensions.

            7.   The method of claim 5 wherein said step of
20   removing said waste further comprising the steps of:

vacuuming any light materials from the coins;

removing any fluids accompanying the coins;

returning to said user a first type of coins based on electro-magnetic properties; and
25   returning to said user a second type of coins based on physical dimensions.

            8.   The method of claim 5 wherein said coins include currency, tokens, slugs, and damaged and/or irregular coins.
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            9.   The method of claim 5 further comprising the steps of:

counting a number of coins within each denomination; and
35   displaying the value of said coins within each denomination.

10.   The method of claim 5 wherein said value of cash voucher is equal to the value of coins deposited.

11.   The method of claim 5 wherein said value of cash voucher is equal to the value of the coins deposited less a fee.

12.   The method of claim 5 wherein said value of cash voucher is equal to the value of the coins deposited plus a bonus.

13.   The method of claim 5 wherein said coupon dispensing step comprises dispensing coupons based on the value of the coins deposited.

14.   The method of claim 5 wherein said coupon dispensing step comprises dispensing coupons based on the number of coins deposited.

15.   The method of claim 5 wherein said coupon dispensing step comprises dispensing coupons regardless of the number or value of coins deposited.

16.   The method of claim 5 further comprising the steps of:
        pivoting the intermediate holding area to return the coins to the user in response to a user input rejecting the total amount; and
        pivoting the intermediate holding area to deposit the coins into a storage area in response to a user input accepting the total amount.

17.   The method of claim 5 wherein said step of depositing the coins in response to a user input accepting the total amount further comprising the steps of:
        allowing the user to choose to donate to charity in whole or in part the value of said coins;

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allowing the user to choose between different charity organizations;

maintaining a record of the value to be donated;

maintaining a record of the charity organization
5   chosen;

dispensing a receipt for the value donated to
charity; and

dispensing a cash voucher for the difference between
the value of said coins and the value of said donation.
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18.   An apparatus comprising:

means for receiving a plurality of coins of arbitrary
denomination from a user;

means, coupled to said means for receiving, for
15   sorting said coins into groups, with each group being one of
said denominations;

means, coupled to said means for sorting, for
determining a total amount of said coins; and

means, coupled to said means for determining, for
20   dispensing a cash voucher for a value related to said total
amount.

19.   The apparatus of claim 18 wherein waste is
included among said coins further comprising means for removing
25   said waste from said coins.

20.   An apparatus comprising:

means for receiving a plurality of coins of arbitrary
denomination from a user;
30   means, coupled to said means for receiving, for
sorting said coins into groups, with each group being one of
said denominations;

means, coupled to said means for sorting, for
dispensing manufacturers' coupons;
35   means, coupled to said means for dispensing, for
determining a total amount of said coins; and

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means, coupled to said means for determining, for dispensing a cash voucher for a value related to said total amount.

5   21.   The apparatus of claim 20 wherein waste is included among said coins further comprising means for removing said waste from said coins.

          22.   An apparatus comprising:
10   means for receiving a plurality of coins of arbitrary denomination from a user;
          means, coupled to said means for receiving, for removing waste included among said coins;
          means, coupled to said means for receiving, for
15   dispensing manufacturers' coupons;
          means, coupled to said means for receiving, for sorting said coins into groups, with each group being one of said denominations;
          means, coupled to said means for sorting, for
20   determining a total amount of said coins;
          means, coupled to said means for determining, for displaying the total amount of said coins;
          means, coupled to said means for sorting, for holding the coins in an intermediate holding area;
25   means, coupled to said means for holding, for returning the coins to the user in response to a user input rejecting the total amount;
          means, coupled to said means for holding, for depositing the coins into a storage area in response to a user
30   input accepting the total amount; and
          means, coupled to said means for depositing, for dispensing a cash voucher for a value related to said total amount in response to a user input accepting the total amount.

35   23.   The apparatus of claim 22 wherein said waste removal means comprises:
          means for blowing any light materials from the coins;

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means, coupled to said means for blowing, for removing any fluids accompanying the coins;

means, coupled to said means for removing, for returning to said user a first type of coins based on electro-
5 magnetic properties; and

means, coupled to said means for returning, for returning to said user a second type of coins based on physical dimensions.

10   24.   The apparatus of claim 22 wherein said waste removal means comprises:

means for vacuuming any light materials from the coins;

means, coupled to said means for vacuuming, for
15 removing any fluids accompanying the coins;

means, coupled to said means for removing, for returning to said user a first type of coins based on electro-magnetic properties; and

means, coupled to said means for returning, for
20 returning to said user a second type of coins based on physical dimensions.

          25.   The apparatus of claim 22 wherein said coins include currency, tokens, slugs, and damaged and/or irregular
25 coins.

          26.   The apparatus of claim 22 further comprising:

means for counting a number of coins within each denomination; and
30   means, coupled to said means for counting, for displaying the value of said coins within each denomination.

          27.   The apparatus of claim 22 wherein said value of cash voucher is equal to the value of coins deposited.
35

          28.   The apparatus of claim 22 wherein said value of cash voucher is equal to the value of the coins deposited less a fee.

20

29. The apparatus of claim 22 wherein said value of cash voucher is equal to the value of the coins deposited plus a bonus.

5   30. The apparatus of claim 22 wherein said coupon dispensing means comprises dispensing coupons based on the value of the coins deposited.

31. The apparatus of claim 22 wherein said coupon
10 dispensing means comprises dispensing coupons based on the number of coins deposited.

32. The apparatus of claim 22 wherein said coupon dispensing means comprises dispensing coupons regardless of the
15 number or value of coins deposited.

33. The apparatus of claim 22 further comprising:
        means for pivoting the intermediate holding area to return the coins to the user in response to a user input
20 rejecting the total amount; and
        means for pivoting the intermediate holding area to deposit the coins into a storage area in response to a user input accepting the total amount.

25   34. The apparatus of claim 22 wherein said coin depositing means comprises:
        means for allowing the user to donate to charity in whole or in part the value of said coins;
        means, coupled to said means for allowing the user to
30 donate to charity, for allowing the user to choose between different charity organizations;
        means, coupled to said means for allowing the user to choose between different charity organizations, for maintaining a record of the value to be donated;
35   means, coupled to said means for maintaining a record of the value donated, for maintaining a record of the charity organization chosen;

means, coupled to said means for maintaining a record, for dispensing a receipt for the value donated to charity; and

means, coupled to said means for dispensing a
5   receipt, for dispensing a cash voucher for the difference between the value of said coins and the value of said donation.
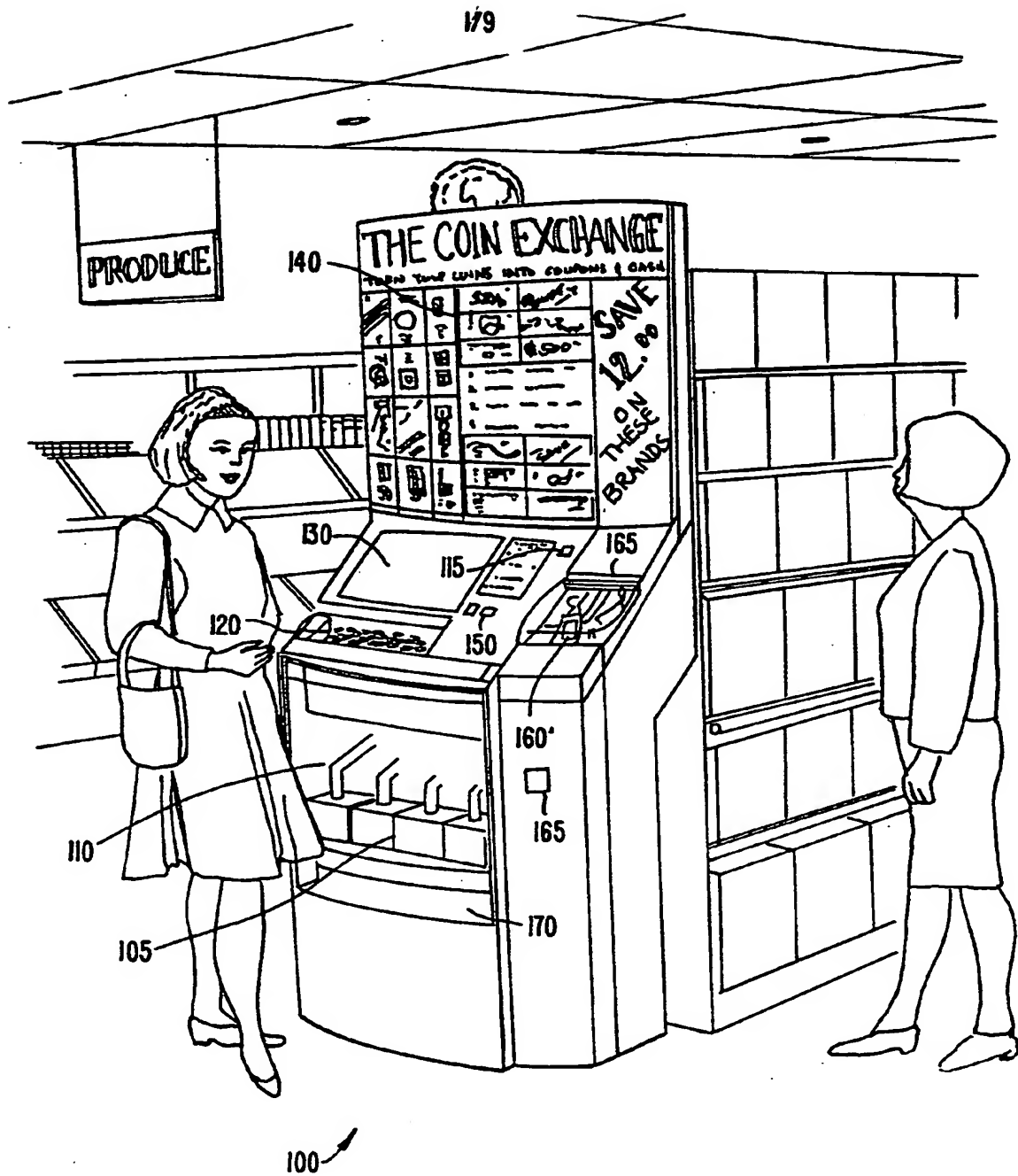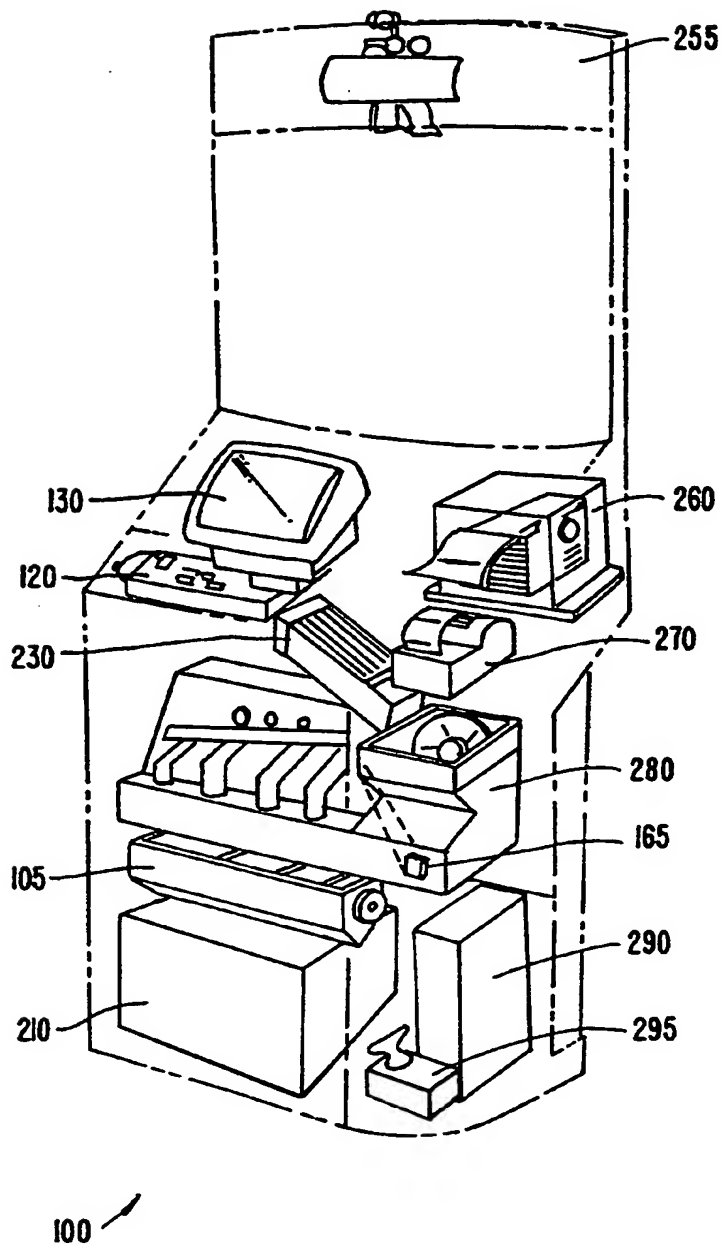
FIG. 1.
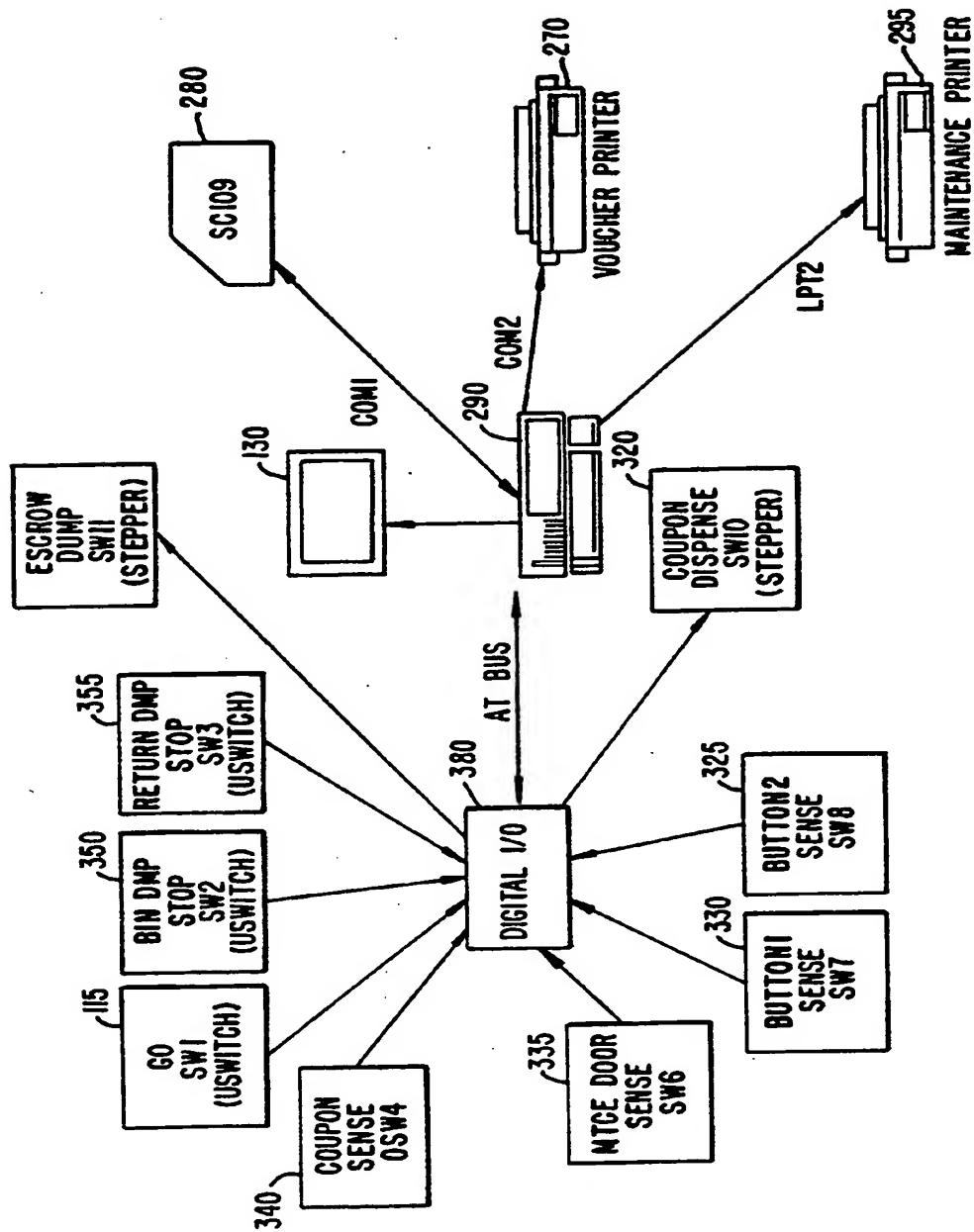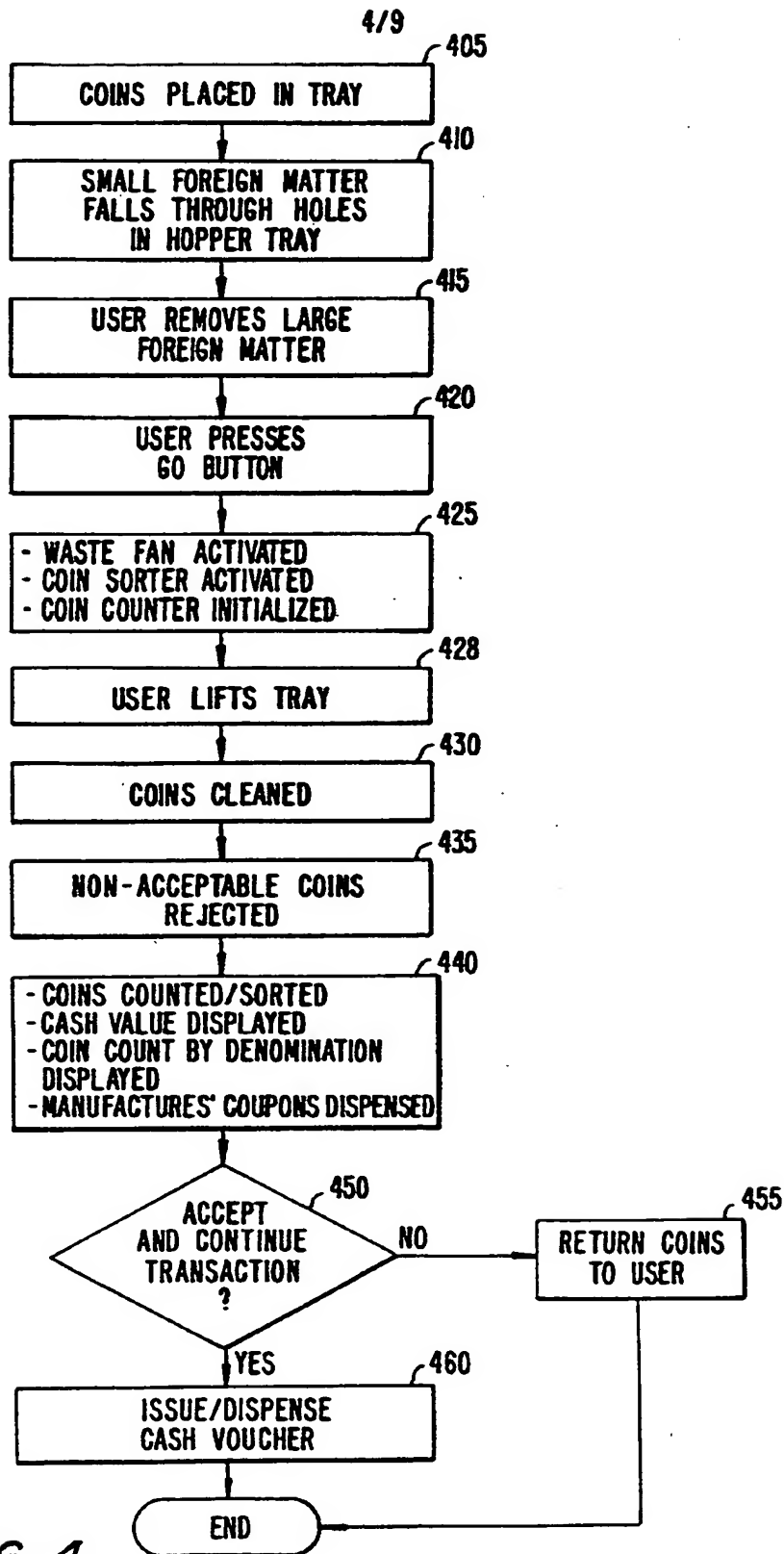
130
120
230
105
210
100

255
260
270
280
165
290
295

FIG. 2.

FIG. 3.

```
                              ┌─405
        ┌──────────────────────────┐
        │   COINS  PLACED  IN TRAY  │
        └──────────────────────────┘
                      │          ┌─410
        ┌──────────────────────────┐
        │   SMALL FOREIGN MATTER    │
        │   FALLS THROUGH HOLES     │
        │   IN HOPPER TRAY          │
        └──────────────────────────┘
                      │          ┌─415
        ┌──────────────────────────┐
        │   USER REMOVES LARGE      │
        │   FOREIGN MATTER          │
        └──────────────────────────┘
                      │          ┌─420
        ┌──────────────────────────┐
        │   USER PRESSES            │
        │   GO  BUTTON              │
        └──────────────────────────┘
                      │          ┌─425
        ┌──────────────────────────┐
        │ - WASTE FAN ACTIVATED     │
        │ - COIN SORTER ACTIVATED   │
        │ - COIN COUNTER INITIALIZED│
        └──────────────────────────┘
                      │          ┌─428
        ┌──────────────────────────┐
        │   USER  LIFTS  TRAY       │
        └──────────────────────────┘
                      │          ┌─430
        ┌──────────────────────────┐
        │   COINS CLEANED           │
        └──────────────────────────┘
                      │          ┌─435
        ┌──────────────────────────┐
        │ NON-ACCEPTABLE COINS      │
        │ REJECTED                  │
        └──────────────────────────┘
                      │          ┌─440
        ┌──────────────────────────┐
        │ - COINS COUNTED/SORTED    │
        │ - CASH VALUE DISPLAYED    │
        │ - COIN COUNT BY DENOMINATION│
        │   DISPLAYED               │
        │ - MANUFACTURES' COUPONS DISPENSED│
        └──────────────────────────┘
```

ACCEPT AND CONTINUE TRANSACTION ? — 450

NO → RETURN COINS TO USER — 455

YES — 460

ISSUE/DISPENSE CASH VOUCHER

END

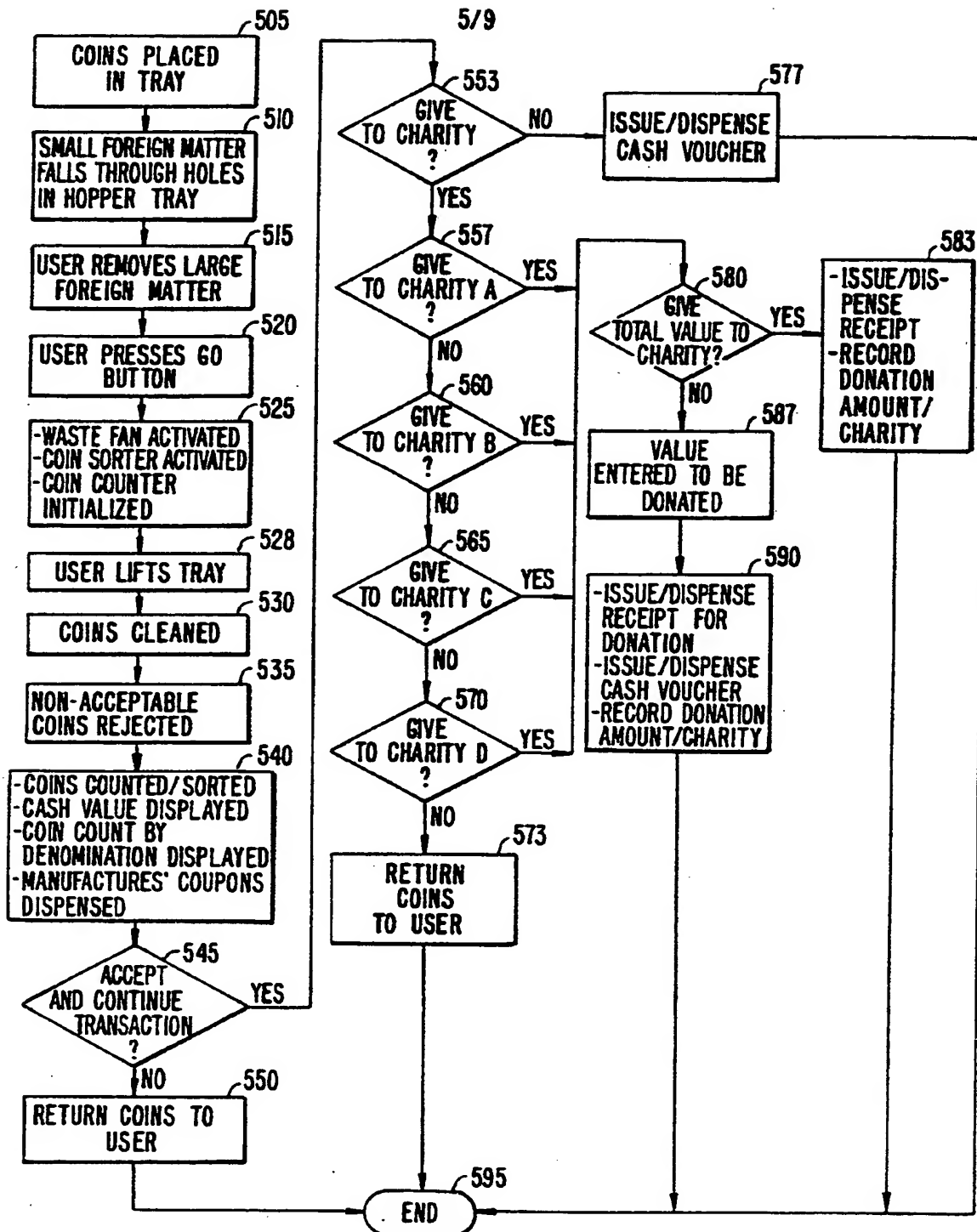**FIG. 4.**

FIG. 5.

FIG. 6.

FIG. 7.

FIG. 8A.

FIG. 8B.

8/9

FIG. 9.

FIG. 11.
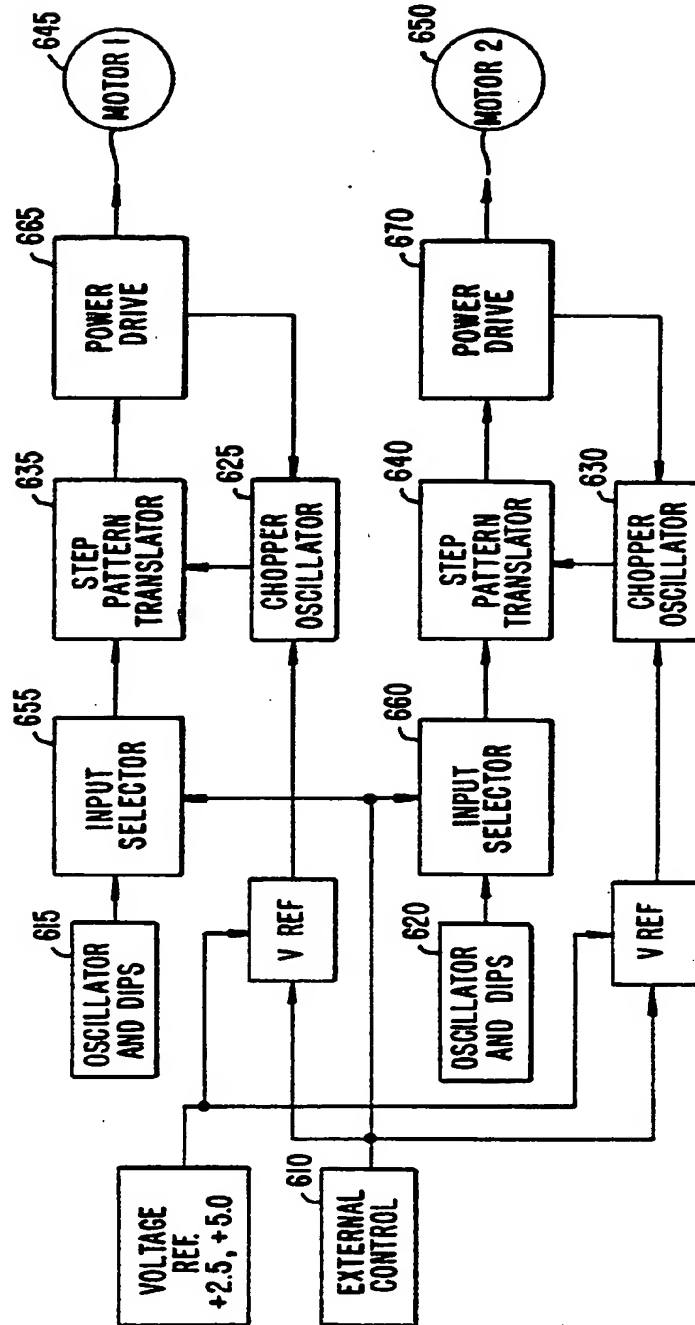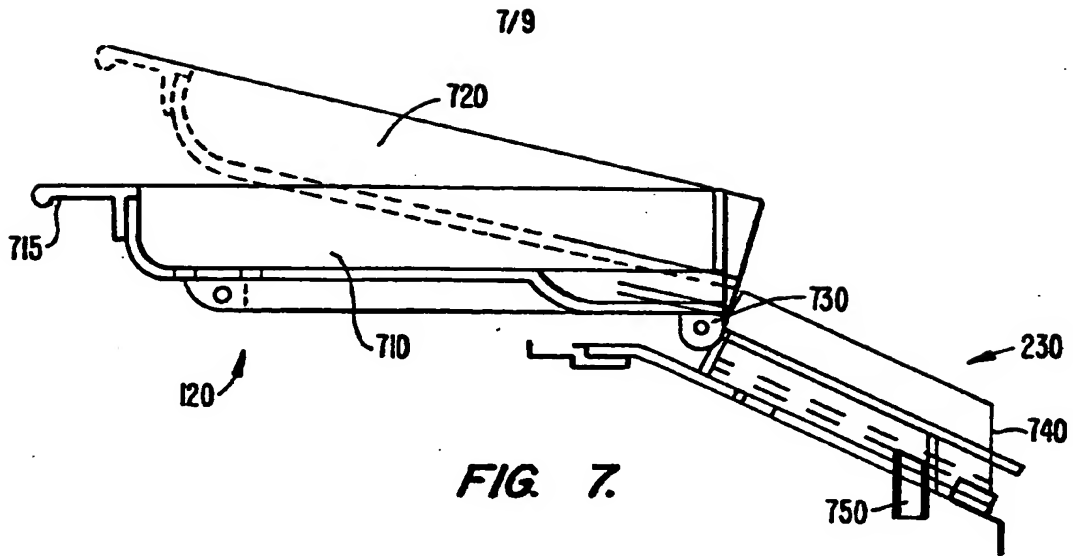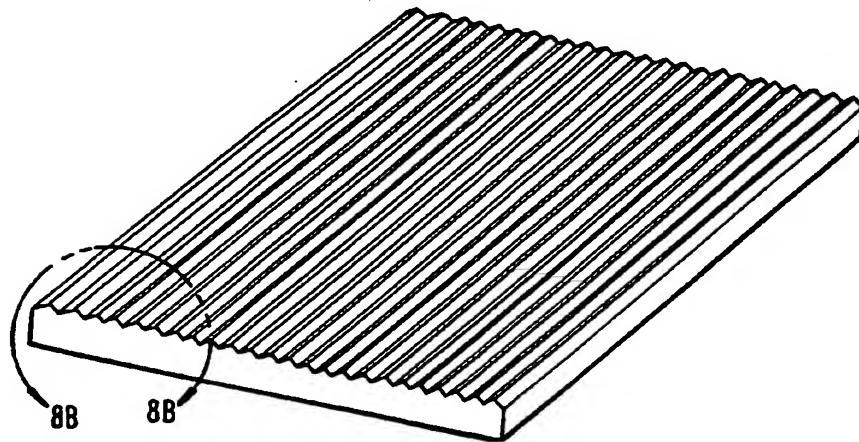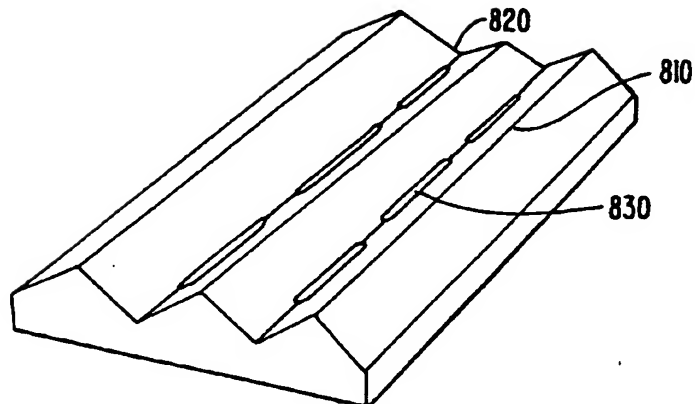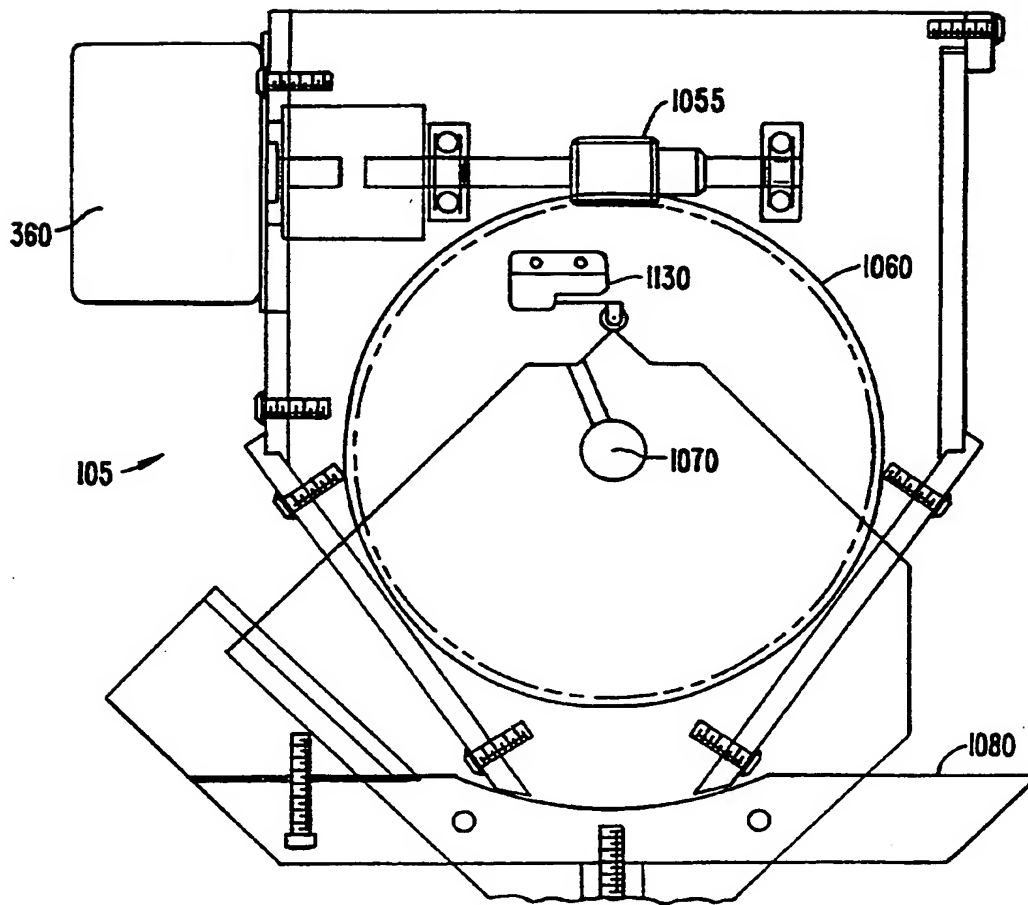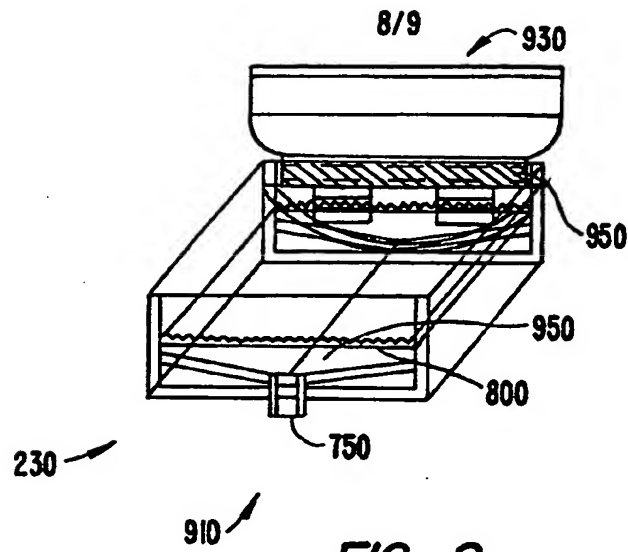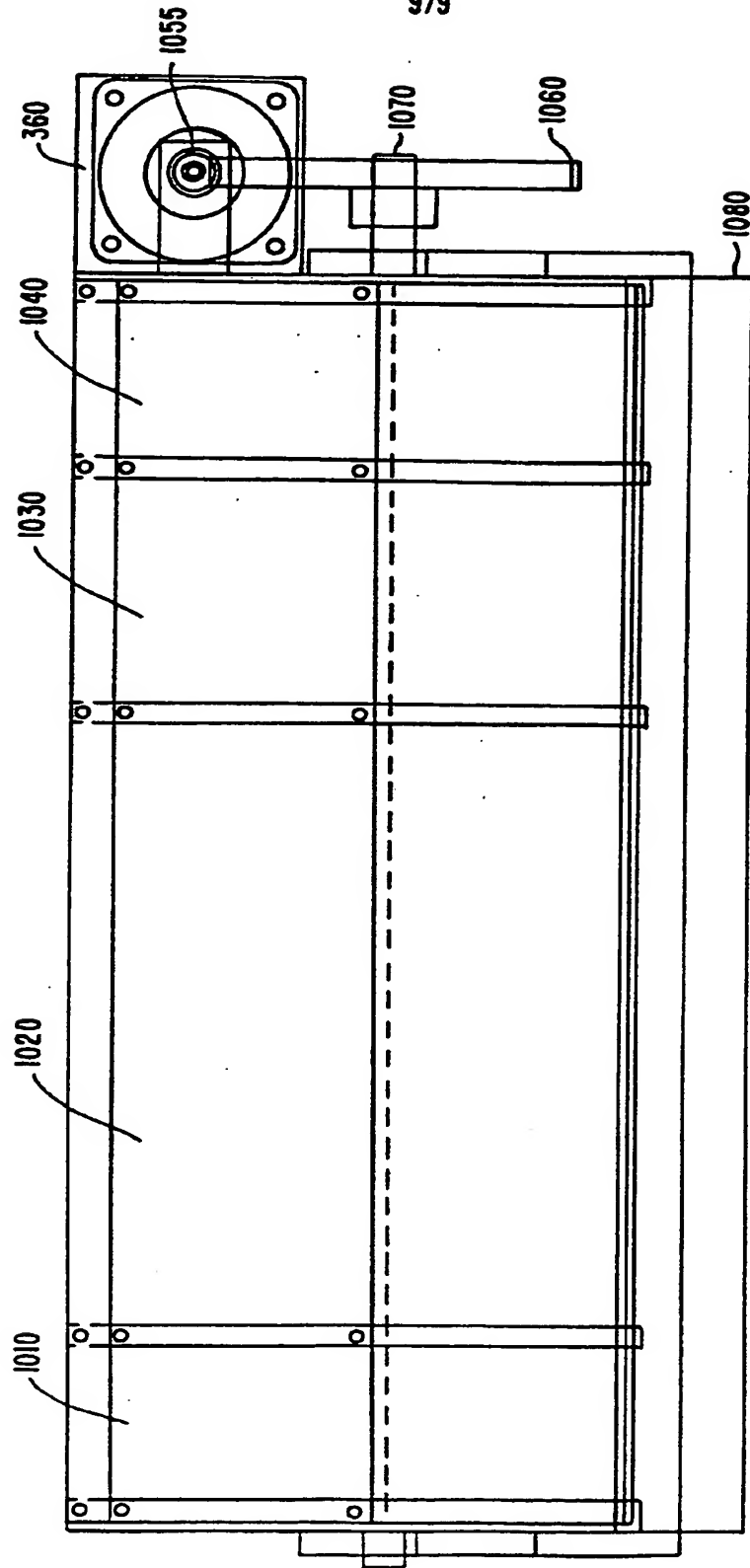
SUBSTITUTE SHEET

FIG 10.

A. CLASSIFICATION OF SUBJECT MATTER
IPC(5)   :G07D 3/16
US CL   :194/346
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. :   194/346, 347, 348; 186/52; 457/3,8; 235/381,383

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X — Y	US,A, 4,383,540 (DeMeyer et al.) 17 May, 1983 See col. 3, line 20 to col. 4, line 20.	1,2,18 19 ———— 3-17 20-34
Y	US,A, 5.039,848 (Stoken) 13 August, 1991 See col. 3, lines 4-29.	3-17 20-34
Y	JP,A, 3-92994 (Ichihara) 18 April, 1991 See the Abstract.	6,7,23 24
Y	US,A, 4,249,552 (Margolin et al.) 10 February, 1981 See col. 11, lines 9-56.	16,23

| X | Further documents are listed in the continuation of Box C. | ☐ | See patent family annex. |

*	Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A"	document defining the general state of the art which is not considered to be part of particular relevance		
"E"	earlier document published on or after the international filing date	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O"	document referring to an oral disclosure, use, exhibition or other means		
"P"	document published prior to the international filing date but later than the priority date claimed	"&"	document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
12 November 1993	19 NOV 1993

Name and mailing address of the ISA/US	Authorized officer
Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231	F.J. Bartuska
Facsimile No. NOT APPLICABLE	Telephone No. (703) 308-1113

Form PCT/ISA/210 (second sheet)(July 1992)*

INTERNATIONAL SEARCH REPORT

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	Washington Post, 02 July, 1991 Martha M. Hamilton, "Turning cans into cold cash", pages D1 and D4.	17 and 34
A	US,A, 4,910,672 (Off et al.) 20 March, 1990	none